

FUNGI OF NEW CALEDONIA III. SOME INTERESTING DEMATIACEOUS HYPHOMYCETES FROM LEAF LITTER.

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ABSTRACT. - This third contribution on New Caledonian forest leaf litter fungi considers five additional dematiaceous hyphomycetes examined under damp chambers conditions in the laboratory. They represent new records to the mycoflora of New Caledonia. Taxa discussed are : *Dictyochoaeta simplex* (S. Hughes & W. B. Kendr.) Hol.-Jech., *Diptocladiella scalaroides* G. Arnaud ex M. B. Ellis, *Endophragmiella boewei* (J. L. Crane) S. Hughes, *Hemicospora coronata* B. Sutton & P. M. Kirk and *Staphylotrichum coccosporum* J. Mey. & Nicot.

RÉSUMÉ. - Cette troisième contribution sur les champignons des litières forestières de Nouvelle-Calédonie traite de cinq autres hyphomycètes dématiés, également inédits pour la mycoflore de ce territoire et observés en chambres humides au laboratoire. Les espèces considérées sont: *Dictyochoaeta simplex* (S. Hughes & W.B. Kendr.) Hol.-Jech., *Diptocladiella scalaroides* G. Arnaud ex M.B. Ellis, *Endophragmiella boewei* (J.L. Crane) S. Hughes, *Hemicospora coronata* B. Sutton & P.M. Kirk et *Staphylotrichum coccosporum* J. Mey & Nicot.

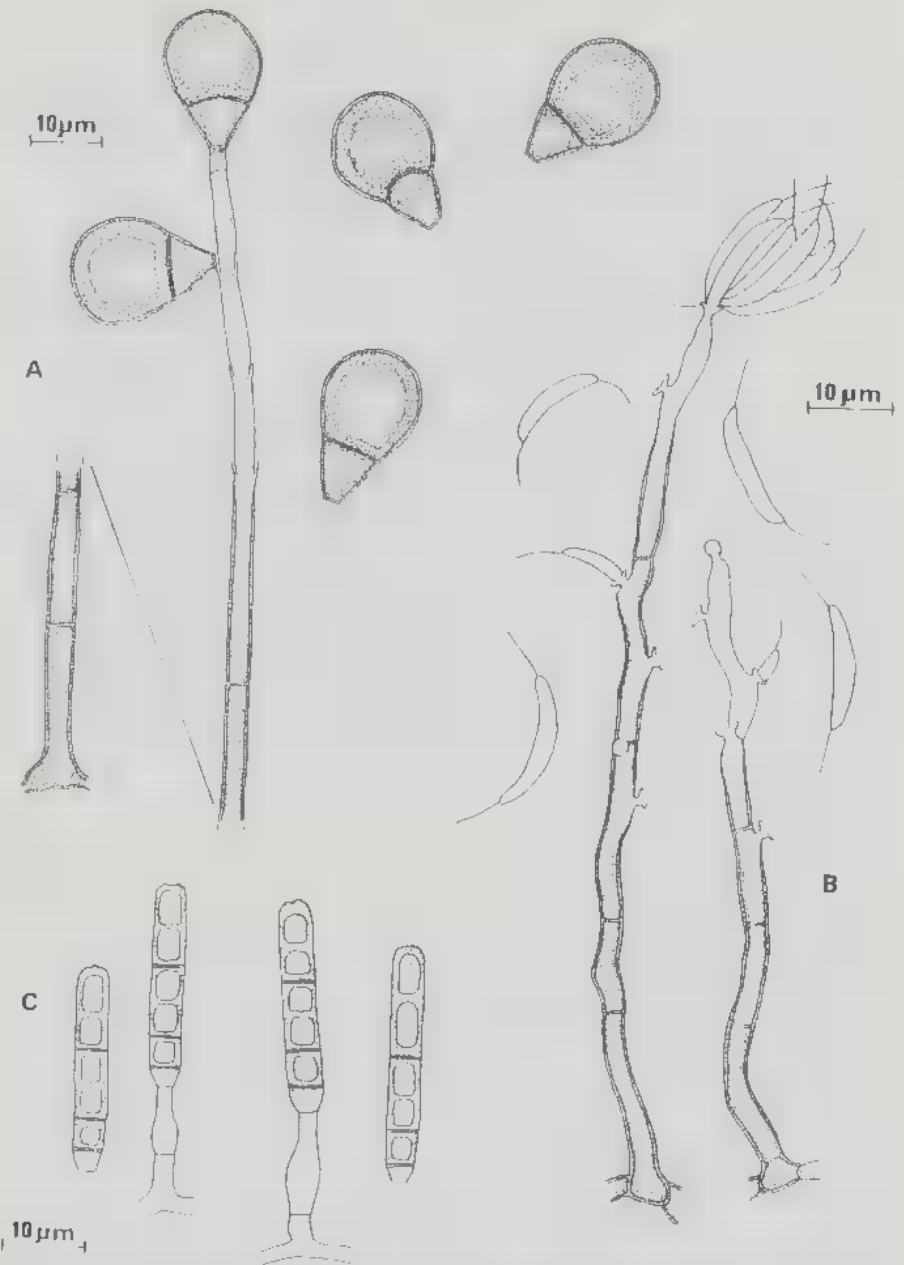
INTRODUCTION

Two previous contributions on fungi of New Caledonia (Mouchacca, 1990 a & b) reported interesting dematiaceous hyphomycetes inhabiting forest leaf litter. In this paper the taxonomic and biologic characteristics of five additional taxa are discussed. These species have been observed developing under damp chambers conditions in the laboratory. All taxa hitherto considered are new records to the mycoflora of New Caledonia.

Dictyochoaeta simplex (S. Hughes & W.B. Kendr.) Hol.-Jech., *Folia Geobot. Phytotax.* 19: 434, 1984. Pl. 1, fig. B; Pl. 4, figs A & E.

Codinæa simplex S. Hughes & W. B. Kendr. - *N. Z. J. Bot.* 6: 362, 1968 (basionym).

Colonies effuse. Mycelium mostly immersed. Setae absent. Conidiophores macronematous, mononematous, arising singly or mostly in small groups, erect, straight or slightly curved and irregularly geniculated, simple, septate, thick-walled and brown to mid brown at the base, thinner-walled and paler brown towards the apex,



Pl. 1 - A. *Endophragmiella boewei*: conidiophore, percurrent conidiogenous cells and conidia. B. *Dictyochaeta simplex*: conidiophore, phialides and conidia. C. *Henicospora coronata*: short conidiophores, conidiogenous cells and conidia.

Pl. 1 - A. *Endophragmiella boewei*: conidiophore, cellules conidiogènes percurrentes et conidies. B. *Dictyochaeta simplex*: conidiophore, cellules conidiogènes polyphialidiques et conidies. C. *Henicospora coronata*: conidiophores courts, cellules conidiogènes monoblastosporées et conidies.

smooth, up to 180 μm long, 2.5-3.5 μm wide, sympodially proliferating. Conidiogenous cells polyphialidic, integrated, terminal or intercalary, with conspicuous funnel-shaped, pale brown to subhyaline collarettes, 2.5-3.5 μm wide, c. 1.5 μm deep. Conidia aggregated in slimy masses on the phialide, continuous, smooth, hyaline, with protoplasm slightly granular, fusiform to cylindrical, curved, 15.0-16.5 x 1.5-2.5 μm ; conidia bluntly pointed at the apex, tapered and with an inconspicuous scar at the base and provided at each end with straight or gently curved setulae, 5.5-7.0 μm long.

Distribution : On bark of *Weinmannia racemosa* (type material) and *Rubus* sp., New Zealand (Hughes & Kendrick, 1968); on decaying *Castanopsis* sp. leaves, Wau, Papua - New Guinea (Matsushima, 1971); on decaying forest leaf litter, Malaysia (Kuthubutheen & Nawawi, 1991 a); on leaf litter of *Eucalyptus globulosus*, India (Dorai & Vittal, 1987); on dead leaves of *Podocarpus macrophyllus* in Japan and on *Bischofia javanica* leaves and several other plants in Taiwan (Matsushima, 1975, 1980); on *Eucalyptus* sp. leaves, Sao Paulo, Brazil (Sutton & Hodges, 1975); on dead wood of *Calophyllum antillanum*, Cuba (Castañeda, 1985); on leaf litter from Ivory Coast (Rambelli et al., 1983); on dead wood of *Quercus petraea*, *Q. robur* and cupules of *Fagus sylvatica*, continental Europe (Holubova-Jechova, 1984); on a wide variety of decaying leaves, cupules of *F. sylvatica* and other Fagaceae and herbaceous stems, Great Britain (Kirk, 1981); on leaf litter, Monts Koghis, Nouméa, New Caledonia.

The genus *Dictyochaeta* Sp. 1923, inclusive of several taxa previously referred to *Codinaea* Maire 1927, actually comprises a large number of species. Kuthubutheen & Nawawi (1991 b) recently published a key to the almost sixty taxa admitted in *Dictyochaeta* and those species still remaining in *Codinaea*. The present species is a member of the group of *Dictyochaeta* having unicellular setulate conidia : 32 species (Kuthubutheen & Nawawi, 1991 b). It is very close to *D. coffeae* Maggi & Persiani 1984, apparently known only from the Mexican type material. It could be distinguished from the latter by its slightly larger and definitely narrower conidia. From available informations, *D. simplex* is of wide geographic distribution having been observed developing on various plant substrata in several tropical and temperate localities.

Diplocladiella scalaroides G. Arnaud ex M.B. Ellis, More Dematiaceous Hyphomycetes (Kew), p. 229, 1976. Arnaud - *Bull. trimest. Soc. Mycol. Fr.* 69: 295, 1953 (*nomen inval.* Art. 36). Pl. 2, figs. B - D; Pl. 3, figs. A - G; Pl. 4, fig. H.

Conidiophores macronematous, mononematous, unbranched, septate, mid brown at the base, pale brown at the apex, up to 50 μm long, 3.0-4.0 μm wide. Conidiogenous cells integrated, terminal, polyblastic, geniculated, sympodial, bearing raised truncate scars. Conidia holoblastic, pale brown, smooth, 8-celled, the basal cell lighter in colour, triangular, 2-horned, horns 2-septate with the small terminal cell narrowing to give rise to a subhyaline appendage, 28.5-33.0 μm wide from horn tip to horn tip.

Distribution: On rotten bark of ? *Fraxinus excelsior*, Versailles, France, type locality (Arnaud, 1953); on dead wood of *Ulex europaeus*, fallen leaves of *Quercus ilex*, *Laurus nobilis*, Great Britain (Ellis, 1976; Kirk, 1982, 1983); on dead leaves and litter of *Daphniphyllum macropodis* var. *humulis*, Japan (Tubaki, 1958; Matsushima, 1975); on dead leaves of *Castanopsis cuspidata* var. *sieboldii*, Okinawa (Matsushima,

1975); on dead leaves of several plants, Taiwan (Matsushima, 1980); on decaying leaves of *Acacia aulacocarpa*, Australia (Matsushima, 1989); on dead wood of *Eucalyptus* sp., Cuba (Castañeda, 1986); on foam samples from several localities in Europe (Shearer & Webster, 1985; Descals & Chauvet, 1992), Malaysia (Nawawi, 1985 a) and India (Subramanian & Bhat, 1981); on leaf litter, Monts Koghis, Nouméa, New Caledonia.

The genus *Diplocladiella* was established by Arnaud (1953) with the single species *D. scalaroides*. No Latin description was provided and the names were therefore invalid. In 1975, based on specimens collected in Japan, Matsushima published in his '*Icones microfungorum a Matsushima lectorum*' a short description of the characteristic triangular shaped conidia of this hyphomycete. Whether to consider this short note in Latin as a compound generic and specific Latin description required to validate the genus (Art. 42 of I.C.B.N.) is a matter of debate. In 1976, after studying an English collection of that fungus matching "Arnaud's description in French and excellent (original) figures" Ellis validated the genus *Diplocladiella* by publishing a generic and specific Latin diagnosis. He designated the type as: "Typus N° 767".

Around 1970, part of the original material of G. Arnaud was deposited at the Laboratoire de Cryptogamie (PC). Nicot & Charpentier (1971) then published a list of all hyphomycete names treated by Arnaud (1952, 1953) indicating which taxa have material still available in that collection. This information is given in the last column of their list headed "N° Herbarium". However numbers reported in that column are not specimen numbers; they refer to the plate number Arnaud used to draw for the corresponding fungus. For *D. scalaroides* two plate numbers were given: 767 and 2233. Ellis selected the first as the type.

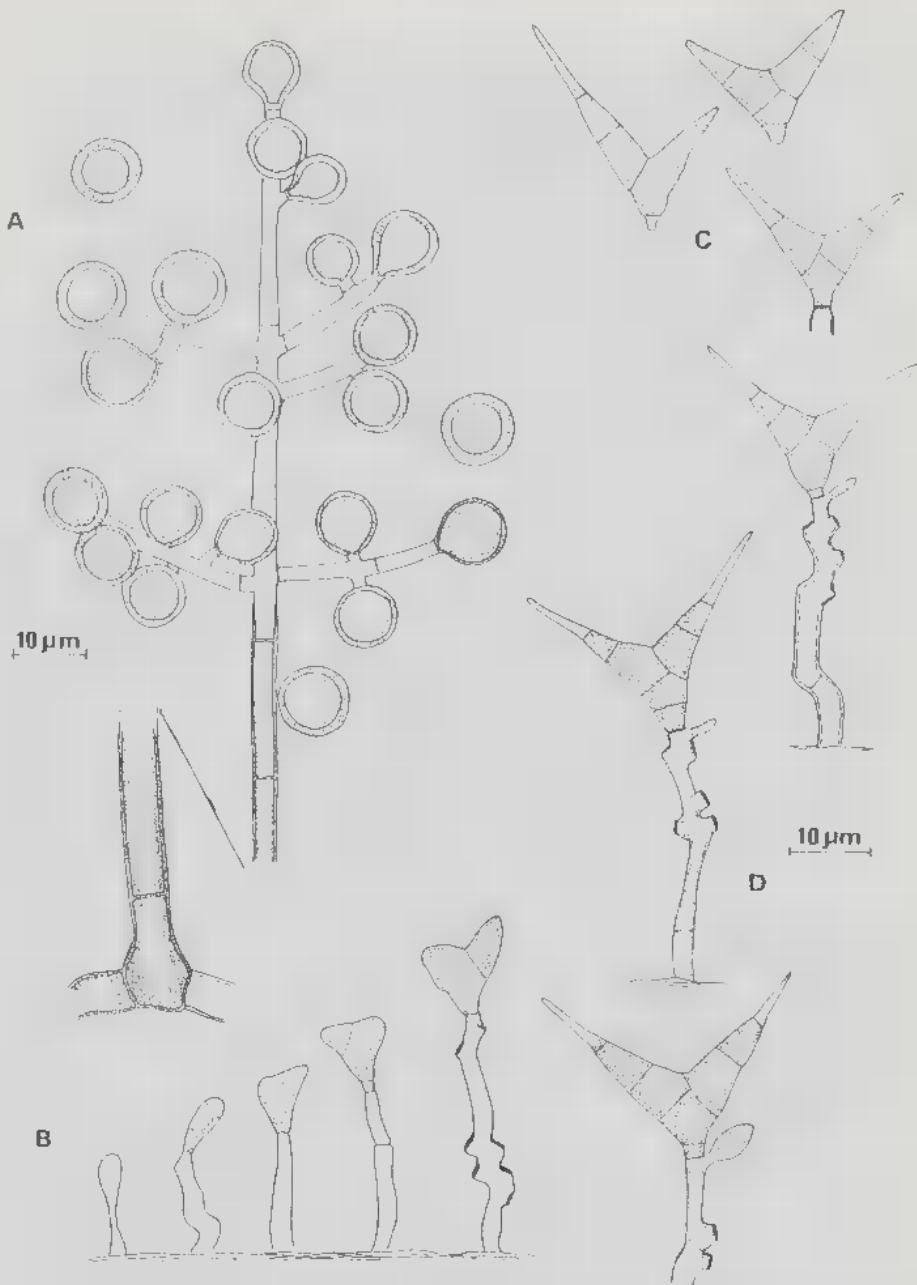
In Arnaud collection, there exists however a specimen bearing the following hand writing and author's signature: Pl. (for Planche) 2233 - *Diplocladiella scalaroides* (for *scalaroides* as published): Sur l'écorce pourrissante d'une petite branche morte tombée (? *Fraxinus excelsior*). En sous-bois, Parc de Versailles, S et O (referring to département Seine et Oise). Récoltée le 6 octobre 1945, laissée en chambre humide jusqu'au 12 octobre.

The above specimen consists of several small pieces of bark. Microscopic examination reveals that *D. scalaroides* material is rather scanty. However the small number of conidia observed perfectly match the original figures of Arnaud and the description of Ellis, with, in particular, the maximum conidial value reported by the latter: 30 µm. As the specimen upon which Pl. 767 was based can now be considered lost, the specimen used for Pl. 2233 should be designated as lectotype.

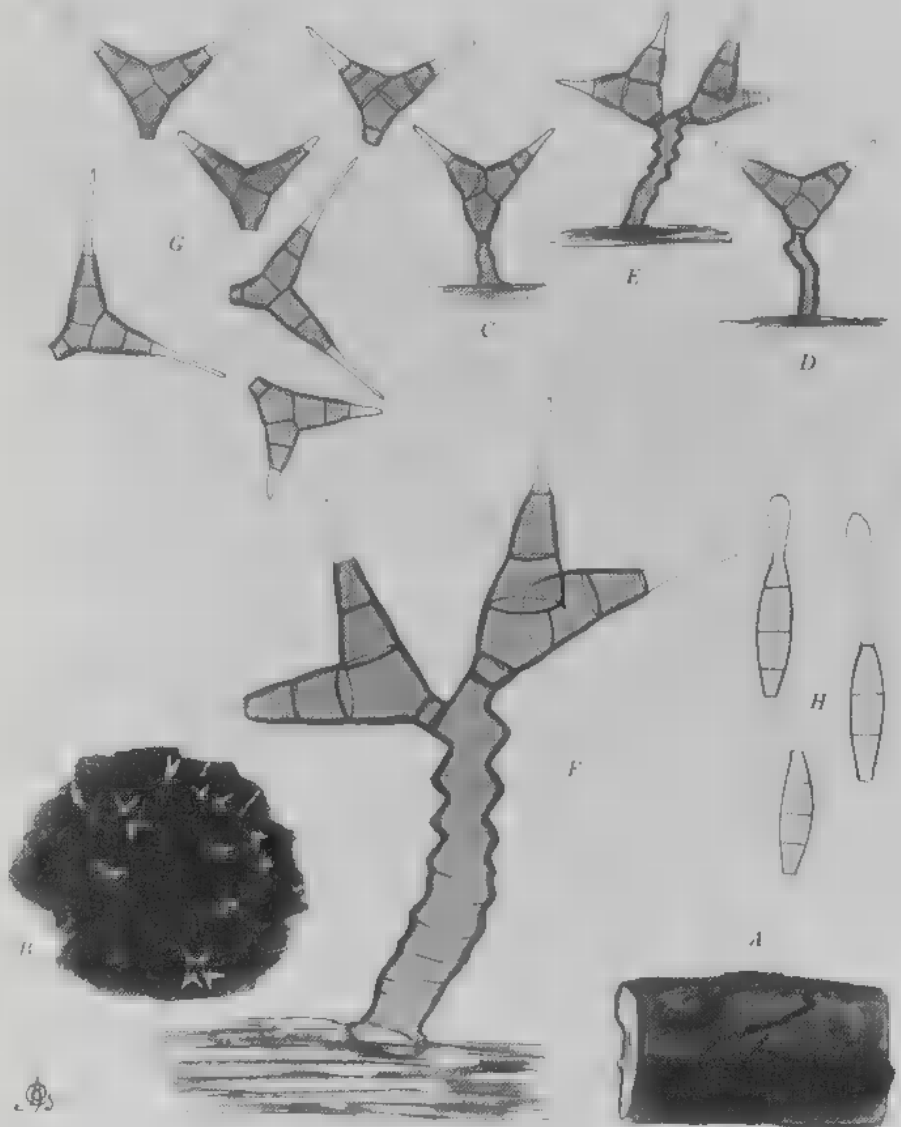
Diplocladiella scalaroides proves to be a cosmopolitan fungus having been observed several times basically from terrestrial habitats but also in a diversity of foam samples. In addition to the type species, four other taxa have been added to the genus: *D. tricladioides* Nawawi (1985 b), *D. appendiculata* Nawawi (1987), *D. heterospora* R. F. Castaneda (1988) and *D. taurina* Cazau et al. (1993).

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Pl. 2 - A: *Staphylotrichum coccosporum*: conidiophore with conidia. B-D: *Diplocladiella scalaroides* original drawings reproduced from Arnaud plate n° 767; B: successive primary stages in conidial development; C: advanced stages in conidial maturation; D: conidiophores with mature conidia.



Pl. 2 - A: *Staphylotrichum coccosporum*: conidiophore et conidies blastosporées. B-D: *Diplocladiella scalaroides*: dessins originaux de la planche n° 767 d'Arnaud; B: premières étapes du développement conidien; C: mode de formation particulier des conidies; D: conidiophores bien développés, porteurs de conidies caractéristiques du champignon.



Endophragmiella boewei (J.L. Crane) S. Hughes - N. Z. J. Bot. 17: 147, 1979, Pl. 1, fig. A; Pl. 4, fig B & D.

Endophragmia boewei J. L. Crane - Mycologia 64: 658, 1972 (basionym).

Colonies effuse, hairy, brown. Mycelium mostly immersed in the substratum. Conidiophores macronematous, mononematous, arising singly, simple, erect, straight or slightly flexuous, septate, smooth, brown, paler and thinner-walled towards the apex, up to 250 μm long, 2.5-4.0 μm wide near the base, with up to 10 successive percurrent proliferations. Conidiogenous cells monoblastic, integrated, terminal, percurrent, pale brown, cylindrical, slightly constricted in the point of secession of the previous conidium, 11.0-18.0 x 2.5-3.5 μm . Conidial secession rhexolytic. Conidia broadly pyriform, smooth, thick-walled, 1-septate below the mid point, pale brown, 18.5-23.5 x 13.5-15.0 μm ; upper cell larger, lower cell smaller and with a small basal ring 1.5-2.0 μm wide. Mature conidia often remaining attached for some time to the conidiophores in an alternate manner.

Distribution: On decayed plant material, Illinois, type locality (Crane, 1972); on dead leaves of *Sequoia sempervirens* and *Podocarpus macrophyllus*, Japan (Matsushima, 1975); on dead leaves of *P. macrophyllus*, Formosa (Hughes, 1979); on leaf litter of *Pistacia lentiscus*, Italy (Mulas et al., 1993); on leaf litter, Monts Koghiis, Nouméa, New Caledonia.

The genus *Endophragmiella* B. Sutton (1973) comprises to date a large number of taxa part of which were originally ascribed to *Endophragmia* Duvernoy & Maire. Hughes (1979) rejected the name *Endophragmia* and redefined the genus *Endophragmiella* to introduce species with simple and regularly or sporadically branched conidiophores and conidia varying from nonseptate through phragmoseptate to dictyoseptate. He also gave a key for the thirty three *Endophragmiella* species he accepted. This key was later expanded by Kirk in 1985 to integrate the thirteen additional species hitherto described in the six years following Hughes's (1979) publication.

Concerning *E. boewei*, dedicated to the plant pathologist G. H. Boewe (1895-1970), Hughes (1979) discussed the particular method of conidium secession (rhexolytic) followed by regular percurrent proliferations and provided a diagrammatic representation of these mechanisms. Finally *E. boewei* seems to display a cosmopolitan distribution, occurring in several different habitats. The New Caledonian collection has somewhat larger conidiogenous cells and conidia when compared to Crane's and Hughes's collections.

Pl. 3 - *Diplocladiella scalaroides* : Arnaud's original plate n° 2233 and translated annotations; A: wood fragment, 5 cm long, supporting fungal colonies invisible to the naked eye; B: part of the same with *Diplocladiella* conidiophores and conidia; C-E: whole conidiophores; F: details of the conidiophore; G: conidial morphology; H: conidia of *Septocylindrium* sp.

Pl. 3 - *Diplocladiella scalaroides*: planche originale d'Arnaud n°2233; A: fragment de bois, longueur: 5cm, avec colonies fongiques invisibles à l'oeil nu; B: partie de A avec conidiophores et conidies de *Diplocladiella*; C-E: mode d'allongement particulier du conidiophore; F: conidiophore bien développé avec partie apicale sinueuse; G: conidies mûres; H: conidies de *Septocylindrium* sp.

(Reproduction: Laboratoire de Cryptogamie, Muséum National d'Histoire Naturelle)



Henicospora coronata B. Sutton & P.M. Kirk - In Kirk & Sutton, *Trans. Br. mycol. Soc.*, 75: 249, 1980. Pl. 1, fig. C; Pl. 4, fig. F & G.

Trichocladium elegans R. F. Castañeda & G. Arnold - *Revta. Jard. Bot. Nac.* 6(1): 52 & Fig. 8, p. 63. 1985.

Colonies effuse, inconspicuous. Mycelium mostly immersed in the substratum, composed of almost hyaline, smooth, septate, branched hyphae. Conidiophores semi-macronematous, mononematous, arising terminally and laterally from the hyphae, simple, erect, straight, hyaline, smooth, thin-walled, up to 15.0 μm long, 2.0-3.0 μm wide near the base. Conidiogenous cells discrete, terminal, monoblastic, determinate, thin-walled, hyaline; basal part swollen, 3.0-4.0 μm wide, upper part cylindrical. Conidia acrogenous, solitary, cylindrical, rounded at the coronated apex, closed or opened at the base depending on the point of secession, pale brown, smooth, 23.0-28.0 x 4.0-5.0 μm . Conidia each provided with three dark thickened transverse septa (distosepta according to the original description) delimiting two upper cells almost equal in length and a third shorter basal cell with height definitely less than half of the above ones; each apical cell is in addition provided with a less marked median hyaline distoseptum delimiting two vacuoles.

Distribution : On dead leaves of *Eucalyptus grandis*, Trinidad, type locality (Kirk & Sutton, 1980); fallen leaves of *Eucalyptus* sp., Cuba (Castañeda, 1985); dead leaves of *E. saligna*, Hawaii and unidentified *Eucalyptus* spp. from Western Samoa, Hawaii, Australia (Kirk & Sutton, 1980); on decaying plant material, South Africa (Sinclair et al., 1990); leaf litter of *E. tereticorius*, Kerala and from foam samples, Western Ghats, India (Dorai & Vittal, 1987; Subramanian & Bhat, 1981); on leaf litter, Monts Koghiis, Nouméa, New Caledonia.

The genus *Henicospora* P. M. Kirk & B. Sutton (1980) was established to accommodate two fungi : *H. minor* (type species) and *H. coronata* B. Sutton & P. M. Kirk. Both have morphologically similar cylindrical conidia with those of the latter being definitely larger and wider. Kirk & Sutton (1980) then transferred *Trichocladium cylindroclavatum* Matsush. (Matsushima, 1975) to their new genus *Henicospora*. A fourth species was later added by Matsushima in 1989 : *Henicospora queenslandica* Matsush. (as 'queenslandicum'). *H. cylindroclavata* has cylindrical conidia provided with a number of septa greater than those of *H. minima* and *H. coronata*. In addition, *Henicospora queenslandica* has conidia not all being cylindrical.

Pl. 4 - A & E: *Dictyochaeta simplex*. A: conidiophore producing a conidium; E: conidia. B & D: *Endophragmiella boewei*. B: conidiophore and conidia; D: conidia. C: *Staphylotrichum coccosporum*: conidiophore and conidia. F & G: *Henicospora coronata*. F: conidia; G: details of a conidium. H: *Diplocladiella scalaroides*: conidia observed developing on leaf fragment.

Pl. 4. - A & E: *Dictyochaeta simplex*. A: conidie produite à partir d'une phialide apicale du conidiophore; E: conidies bisétulées. B & D: *Endophragmiella boewei*. B: conidiophore et conidies. F & G: *Henicospora coronata*. F: conidies; G: détails d'une conidie. H: *Diplocladiella scalaroides*: conidies observées sur fragment de feuilles incubées.

Trichocladium elegans Castañeda & Arnold (1985) was described as having cylindrical conidia regularly provided with three transverse septa. These conidia were considered to be morphologically close to those of *Henicospora cylindroclavata* (Matsush.) B. Sutton & P. M. Kirk (= *Trichocladium cylindroclavatum* Matsush.); the latter are however provided with a number of transverse septa ranging from 4-8. Although the presence of comparatively less marked median distosepta in each of the two longer apical cells of *T. elegans* conidia is not reported by Castañeda & Arnold (1985), the description and illustrations they provided for that fungus perfectly agree with those established by Kirk & Sutton (1980) for *Henicospora coronata*. Finally, the latter seems to present a geographic distribution limited to warmer climates.

Staphylotrichum coccosporum J. Mey. & Nicot - In Nicot & Meyer, *Bull. trimest. Soc. mycol. Fr.*, 72: 323, 1956. Pl. 2, fig. A; Pl. 4, fig. C.
Botrydiella bicolor Badura - *Allionia* 9: 182, 1963.

Colonies effuse, hairy, pale brown. Mycelium mostly immersed in the substratum. Conidiophores macronematous, mononematous, arising singly, erect, straight or slightly flexuous, smooth, brown at the thick-walled base, pale brown along the stipe, thinner-walled towards the repeatedly branched and hyaline fertile apex, up to 900 μm long, 6.5-13.0 μm wide at the base. Branches often arising at right angles to the main axis and to each other, hyaline, bearing conidiogenous cells and conidia. Conidiogenous cells monoblastic, determinate, cylindrical. Conidia solitary, acrogenous, simple, mostly spherical, sometimes subspherical, pale brown, smooth, thick-walled, continuous, 8.5-10.5 μm diam.

Distribution : Available informations indicates this hyphomycete being most frequently isolated from soil and less so from decomposing plant material; it displays a wide geographic distribution with a preferential occurrence in warmer climates (Domsch et al. 1980); also recently recorded from soil in Czechoslovakia (Kubatova, 1992) and fallen leaves of *Eucalyptus* sp., Cuba (Castañeda, 1985).

The genus *Staphylotrichum* J. Mey. & Nicot is apparently still monospecific. The species *S. coccosporum* is a soil fungus with most records being from tropical areas. However, the small number of such records suggests the species is rare in reported habitats. Soil isolates of *S. coccosporum* show a great morphological variability in culture (Maciejowska & Williams, 1963). Such strains do not usually rapidly produce *in vitro* the characteristic long brownish apically branched conidiophores. Instead they develop micronematous conidiophores and chlamydospores and are thus liable to be incorrectly identified as species of *Humicola* Traaen (Domsch et al., 1980). The present collection from New Caledonia developed from an undetermined fallen leaf. It matches well the description given by Ellis (1971) for that fungus.

Since the publication of the two previous papers on New Caledonian litter fungi, additional informations on the distribution of some treated taxa have become available :

Nakataea fusispora (Matsush.) Matsush. : on dead leaves of *Jambosa vulgaris*, Pinar del Rio, Cuba (Castañeda & Kendrick, 1990 a). Further a new species has been added to the genus : *N. rarissima* R. F. Castañeda & W. B. Kendr. (1990 b).

Paliphora aurea Sivan. & B. Sutton : on dead leaves of *Quercus oleoides* var. *sagraeana* and *Calophyllum antillanum*, Pinal del Rio, Cuba (Castaneda & Kendrick, 1990). Also a second species of *Paliphora* has been described: *P. porosa* Kuthubutheen, *Trans. Br. mycol. Soc.* 89:273, 1987.

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